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ZHANG, JUE	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/531,516	Applicant(s) ETZOLD, PETER
	Examiner Jue Zhang	Art Unit 2838

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

This Office action is in answer to the response filed 5/02/2007. Claims 1-18 are pending, of which original claims 1-9, 12, and 14-18 are amended by the present amendment.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-12, 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keidl et al. ('007), in view of Wu (US PG Pub No. 20020109485, hereinafter '485).

For claims 1 and 9, '007 teaches a method for operating a line-supplied charger (10) (Fig. 1) (col. 3, lines 1-40) for a battery (14) in a maintaining mode for keeping the battery in a charged state, in which the battery (14) alternates cyclically (e.g., the float charging phase, Fig. 3; Fig. 2E) between a resting phase (e.g., the zero current period of the float charging phase) and a refreshing phase (e.g., the current IX period of the float charging phase), in which the battery (14), in the resting phase (e.g., the zero current period of the float charging phase), from self-discharging of the battery (6) (i.e.,during the zero current period of the float charging phase the battery discharges including through the battery self-dischaging), discharges from an upper threshold voltage (Vf ***1.01**) to a lower threshold voltage (**Vf***0.99) which is lower than the upper threshold voltage but is preferably higher than the rated voltage of the battery (Fig. 2E);

and in which the battery (14), in the refreshing phase (e.g., the current IX period of the float charging phase), is charged again from the lower (**Vf***0.99) to the upper threshold voltage (Vf ***1.01**) via a charge transformer (36) of the charger (10) (step 274, Fig. 2E); wherein individual components the charger (10) comprising at least the charge transformer (e.g., the charging circuit including 36 and 32), are switched off from the line voltage (VIN) during the resting phase (e.g., the zero current period of the float charging phase)(Step 266, Fig. 2E)

For claim 9, '007 teaches a charger (10)(Fig. 1) (col. 3, lines 1-40) for charging a battery (14) from a line voltage (VIN), including:

a charge transformer (36 and 32) for transforming the primary line voltage (VIN) into a secondary voltage;

a rectifier, which is connected downstream of the charge transformer (36)(e.g., the BRIDGE and the transformer XFRM in the 36) (col. 3, lines 35-36) on its secondary side, for furnishing a charging voltage for the battery from the secondary voltage;

and a control unit (Fig. 1; Fig. 2E; col. 3, 30-40) for triggering the rectifier (36) via a control signal [e.g., the output of (34)] in response to the charging voltage, in particular in such a way that the battery (14), after its charging phase, is kept in its charged state in that the battery (14) alternates cyclically (e.g., the float charging phase, Fig. 3) between a resting phase (e.g., the zero current period of the float charging phase), in which the battery from self-discharging of the battery (i.e., during the zero current period of the float charging phase the battery discharges including through the self-discharging) discharges from an upper threshold voltage (Vf *1.01) to a lower threshold voltage (Vf*0.99) which is lower than the upper threshold voltage but greater than the line voltage of the battery (e.g., the charger is structurally capable to be programmed by

the microprocessor 12 to meet the limitation), and a refreshing phase (e.g., the current IX period of the float charging phase), in which the battery (14) is charged again from the lower to the upper threshold voltage (Vf *1.01) via the charge transformer (36) of the charger (10)(Fig. 1, 2E, 3; col. 3, lines 1-40);

characterized by a first comparator for generating a first comparison signal (e.g., it is implemented by the microcomputer in the step 284; Fig. 2E), when the battery voltage at the end of the refreshing phase has reached or exceeded the upper threshold voltage (Vf *1.01)(e.g., the charge is structurally capable to perform the function for monitoring the battery voltage through 16, 18 and compare with the upper threshold voltage by microprocessor 12; Fig. 1, 2E, 3; col. 3, lines 1-40);

and a switching device (32) for switching off at least the charge transformer (1), during the resting phase (e.g., the zero current period of the float charging phase), from the line voltage (VIN) in response to a switching signal (charge on/off), which represents the first comparison signal (Fig. 1, 3; col. 3, lines 30-40; col. 2, lines 63-67).

'007 does not explicitly teach that the charge transformer is decoupled or separated from the input power source of the line voltage (AC) during the resting phase (e.g., the zero current period of the float charging phase). However, disconnect a charge transformer from the input power source such as an A.C. main line is well known in the art. For example, in an analogous art, '485 teaches a battery charging device (Fig. 2; Abstract) which use a switch (SW1) to decouple (disconnect) the charge transformer (1) from the A.C power line (Fig. 2) during the charging off phase. '485 further teaches that the charging circuit is actuated through SW1 during the conductive time period for charging the battery, and the supply of the current to the battery is

ceased during the non-conductive time period [0032][0025]. Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a switch to separate the charge transformer from the A.C line input during the resting mode and connect the A.C line to the charge transformer during the charging mode in the charging method of '007, as taught by '485, in order to have charged the battery, because '485 has demonstrated that it is a suitable method in order to have charged the battery.

Claim 2, '007 teaches the limitations of claim 1 as discussed above. It further teaches that the charge-maintaining mode (e.g., float charging phase, Fig. 3; Fig. 2E), the alternation from the resting phase (e.g., the zero current period of the float charging phase) to the refreshing phase (e.g., the current IX period of the float charging phase) takes place whenever the battery voltage has reached or undershot the lower threshold voltage (**Vf***0.99) (step 274, Fig. 2E).

Claim 3, '007 teaches the limitations of claim 1 as discussed above. It further teaches that the battery (14) is charged with a predefined constant charging current during the refreshing phase (e.g., the current IX period of the float charging phase, Fig. 3).

Claim 4, '007 teaches the limitations of claim 1 as discussed above. It further teaches that in the charge-maitaining mode (e.g., the float charging phase, Fig. 3), the alternation from the refreshing phase (e.g., the current IX period of the float charging phase) to the resting phase (e.g., the zero current period of the float charging phase) is effected whenever the battery (14) has been charged to the upper threshold voltage (Vf*1.01) or above it (step 266, Fig. 2E).

Claim 5, '007 teaches the limitations of claim 1 as discussed above. It further teaches that the charge-maitaining mode is preceded by a charging mode (e.g., the constant current charging phase and the constant voltage charging phase of Fig. 3; Fig. 2B), in which the battery

(14), in a first phase, is charged preferably with a constant current to the upper threshold voltage and, in a second phase, is supplied with a constant charging voltage (e.g., the constant voltage charging phase, Fig. 3; Fig. 2C; Fig. 2D).

Claim 6, '007 teaches the limitations of claims 1 and 5 as discussed above. It further teaches that an alternation from the second phase of the charging mode to the charge-maitaining mode, in particular to the resting phase (e.g., the zero current period of the float charging phase), takes place when the upper threshold voltage has been maintained with the aid of the constant charging voltage, and simultaneously the charging current has dropped to a predetermined value that is less than the value of the constant current in the first phase (see the constant voltage charging phase, Fig. 3; steps 260-264, Fig. 2D).

Claim 7, '007 teaches the limitations of claim 1 as discussed above. It further teaches that a computer program provided on a data medium and computer-readble by a battery charger, the computer program have a program code that is embodied for performing the method according to claim 1 (e.g., the charge is a microcomputer (12) based which is inherently program saved on some type of data medium as per flow-chart in Fig. 2)(col. 3, lines 6-8).

For claims 8, '007 teaches the limitations of claim 1 and 7 as discussed above. It further teaches that a data medium that is computer-readable by a battery charger and having a computer program according to claim 7 [Note (col. 3, lines 6-8) which describes the microprocessor 12 is suitably programmed to perform the method as illustrated and described with respect to FIGS. 2A-2E. While not explicitly stated as carried by a computer readable medium, the code must inherently encoded on a computer readable data medium, since it would be impossible for the program to operate in the manner described in (col. 3, lines 6-8), and

elsewhere in the reference, absent being embodied on or in some form of computer readable medium].

For claim 9, '007 teaches a charger (10)(Fig. 1) (col. 3, lines 1-40) for charging a battery (14) from a line voltage (VIN), including:

a charge transformer (36) for transforming the primary line voltage (VIN) into a secondary voltage;

a rectifier, which is connected downstream of the charge transformer (36)(e.g., the BRIDGE and the transformer XFRM in the 36) (col. 3, lines 35-36) on its secondary side, for furnishing a charging voltage for the battery from the secondary voltage;

and a control unit (Fig. 1; Fig. 2E; col. 3, 30-40) for triggering the rectifier (36) via a control signal [e.g., the output of (34)] in response to the charging voltage, in particular in such a way that the battery (14), after its charging phase, is kept in its charged state in that the battery (14) alternates cyclically (e.g., the float charging phase, Fig. 3) between a resting phase (e.g., the zero current period of the float charging phase), in which the battery from self-discharging of the battery (i.e.,during the zero current period of the float charging phase the battery discharges including through the battery self-dischaging) discharges from an upper threshold voltage (Vf *1.01) to a lower threshold voltage (Vf*0.99) which is lower than the upper threshold voltage but greater than the line voltage of the battery (e.g., the charger is structurally capable to be programmed by the microprocessor 12 to meet the limitation), and a refreshing phase (e.g., the current IX period of the float charging phase), in which the battery (14) is charged again from the lower to the upper threshold voltage (Vf *1.01) via the charge transformer (36) of the charger (10)(Fig. 1, 2E, 3; col. 3, lines 1-40);

characterized by a first comparator for generating a first comparison signal (e.g., it is implemented by the microcomputer in the step 284; Fig. 2E), when the battery voltage at the end of the refreshing phase has reached or exceeded the upper threshold voltage (Vf *1.01)(e.g., the charge is structurally capable to perform the function for monitoring the battery voltage through 16, 18 and compare with the upper threshold voltage by microprocessor 12; Fig. 1, 2E, 3; col. 3, lines 1-40);

and a switching device (32) for switching off at least the charge transformer (1), during the resting phase (e.g., the zero current period of the float charging phase), from the line voltage (VIN) in response to a switching signal (charge on/off), which represents the first comparison signal (Fig. 1, 3; col. 3, lines 30-40; col. 2, lines 63-67).

'007 does not explicitly teach that the charge transformer is decoupled or separated from the input power source of the line voltage (AC) during the resting phase (e.g., the zero current period of the float charging phase). '485 reads the same obviousness as discussed in claim 1 rejection above.

Claim 10, '007 teaches the limitations of claim 9 as discussed above. It further teaches that a second comparator for generating a second comparison signal (e.g., it is implemented by the microcomputer in the step 272; Fig. 2E), when the battery voltage at the end of the resting phase has reached or undershot the lower threshold voltage (**Vf***0.99)(e.g., the charger is structurally capable to perform the function for monitoring the battery voltage through 16, 18 and compare with the upper threshold voltage by microprocessor 12 with proper software; Fig. 1, 3; col. 3, lines 1-40)(col. 2, lines 63-67).

Claim 11, '007 teaches the limitations of claims 9 and 10 as discussed above. It further teaches that an OR logic module for furnishing the switching signal (CHARGER ON/OFF) for the switching device (32) as an OR linkage from the first and the second comparison signals [e.g., the OR module function as defined in papa 0015-0016 is implemented in the sequential steps (step 284 and step 272 in particular) of the flow chart Fig. 2E, and carried out by the microprocessor 12].

Claim 12, '007 teaches the limitations of claims 9-11 as discussed above. It further teaches that the two comparison signals are synchronized with one another in such a way that upon generation of the first comparison signal, the second comparison signal is also converted to a state such that the switching signal (32) at the output of the OR logic module assumes a state which opens (i.e., the switch 10 is opened when it is switched off) the switching device (10) [e.g., the synchronization function is implemented in the sequential steps of the flow chart Fig. 2E, and carried out by the microprocessor 12].

Claim 16, '007 teaches the limitations of claim 9 as discussed above. It further teaches that the control unit, the first and second comparators, and/or the OR logic module (180) are

realized as an integrated circuit, preferably as a microcontroller or microprocessor (12) with a suitable computer program [e.g., the program is inherently exist in order for the microprocessor (12) to perform the sequential steps of the flow chart Fig. 2E] (col. 2, lines 63-67).

Claim 17, '007 teaches the limitations of claim 9 as discussed above. It further teaches that the comparators (step 284; Fig. 2E) are embodied by analog hardware (col. 2, lines 63-67)(col. 6, lines 10-11).

3. Claims 13-14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Keidl et al. ('007), in view of Wu ('485), further in view of Faulk (US Patent No. 5,459,652, hereinafter '652).

For claims 13-14, '007 and '485 teach the limitations of claim 9 as discussed above. '007 and '485 do not explicitly teach that a supply transformer (36) for supplying the control unit (2,3,4), on its secondary side, with a supply voltage. '007 and '485 do not explicitly teach that the supply transformer is connected downstream of the switching device (32) and with its primary side is connected parallel to the charge transformer (36).

However, in an analogous art, '652 teaches a power supply (Fig. 3; Abstract) which uses a supply transformer (42)(46) on the secondary side of transformer (28) and at the downstream of the switching device (32) with a boot strip circuit (82, 90) to supply a voltage to the switching control circuit (36). It further teaches that by using the circuit for the powering the control circuit of the switching power supply in order to assure low power during normal operation and safe operation all times (Abstract).

Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the supply transformer circuits

(42)(46) with the boot strip circuit (82, 90) of '652 to power the charging control unit of the switching power supply charging transformer of '007 and '485, as taught by '652, in order to have assured low power during normal operation and safe operation all times, because '652 has demonstrated that it is a suitable method in order to have assured low power during normal operation and safe operation all times.

4. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Keidl et al. ('007), in view of Wu ('485), further in view of Faulk ('652), and further in view of Shiral et al. (US Patent No. 6,434.025, hereinafter '025).

For claims 13-15, '007 '485, and '652 teach the limitations of claim 9 and 13 as discussed above. '007, '485, and '652 do not explicitly teach that the supply transformer is connected upstream of the switching device and is coupled with its primary side to the line voltage (AC). However, in an analogous art, '025 teaches a switching power supply (Fig. 13; Abstract) using a supply transformer (101, 102) to power the control circuits. '025 teaches that the supply transformer (101, 102) is connected upstream of the switching device (Tr1, Tr2), and is coupled with its primary side to the line voltage (AC). It further teaches that by using the supply directly from the AC for powering the control circuit it can fail-safe monitor not only an excessive power supply output, but also for an abnormal drop in output level (Abstract). Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the supply transformer (101, 102) of '025 to power the charging control unit of the switching power supply charging transformer of '007, '485, and '652, as taught by '025, in order to have fail-safe monitored not only an excessive power supply output, but also for an abnormal drop in output level, because '025 has

demonstrated that it is a suitable method in order to have fail-safe monitored not only an excessive power supply output, but also for an abnormal drop in output level.

5. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Keidl et al. ('007), in view of Wu ('485), further in view of Usui et al. (US Patent No. 5,345,094, hereinafter '094).

For claim 18, '007 and '485 teach the limitations of claim 9 as discussed above. "007 does not explicitly teach that the switching device of the charger is embodied as an opto-triac. However, in an analogous art, '094 teaches a power device which includes both optical triac and an output-stage triac in one substrate. It further teaches that the power device can be used as a power controller to control a high AC voltage and large current (col. 1, lines 25-66).

Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the optical triac as the switching device of the charging system of '007 and '485, as taught by '094, in order to have controlled the high AC voltage and large current of the charging system, because '094 has demonstrated that it is a suitable method in order to have controlled the high AC voltage and large current by using the optical triac as the power switch.

Response to Amendment

Applicant's arguments filed on 5/02/2007 have been fully considered but they are not persuasive.

Applicant's arguments with respect to original claims 1-18 have been considered but are moot in view of the new ground(s) of rejection since the independent claims 1 and 9 are

amended to include the limitations "separated the charge transformer from the line voltage during the resting phase" which is a new issue.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jue Zhang whose telephone number is 571-270-1263. The examiner can normally be reached on M-Th 7:30-5:00PM EST, Other F 7:30AM-5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, EASTHOM KARL can be reached on 571-272-1989. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JZ

BAO Q. VU
PRIMARY EXAMINER